

**Information Systems Development Support (ISDS) Contract
Contract Work Order (CWO) Implementation Plan**

for

**CWO 10 - DSCC Tracking Subsystem: 26M Network & DSS-27
Metric Pointing Assembly**

**Developed by
The ISDS Team
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Under

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for the

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Foreword

Due to the timing of these Work Implementation Plans (WIPs) relative to (i.e., subsequent to) the start of the current DSN development efforts, a slightly different approach is being used than would normally be the case. WIPs document the planning that normally precedes development. The document then grows and is modified, if necessary, to reflect a dynamic development environment. Since much of the detail already exists for tasks already in progress at the beginning of the ISDS contract, the WIP references existing detail without significant elaboration. The WIP is envisioned as a central repository to pull together, by reference or inclusion, all the information available for a particular development task. The objective of this exercise is to provide all the information necessary to plan for, then to monitor and control the progress of each development task. This will be done with an eye on improving the total product and reducing redundancy and, thus, paper. Future WIPS will incorporate CASE and other development tools, when authorized, to reduce documentation costs and provide for the integration of the design and documentation processes into a single homogeneous (seamless) process. That is, documentation will be produced as a natural result of the planning, design and implementation process rather than as a separate activity.

Preface

This is the top-level CWO document used for defining and controlling the effort, organizational structure, management authority and responsibility, and resource allocations for the CWO. This is the baseline for continued enhancement and maintenance of the technical and management document developed under the guidelines set forth in DRD MA005 and in the ISDS Program Management Plan and is supported by the ISDS methodology.

The **order of precedence** is the ISDS contract and attachments, then the ISDS Project Management Plan and its supporting procedures, and then this plan. The ISDS Project Management Plan and supporting procedures can be explicitly waived with the concurrence of JPL and ISDS team management. Such actions and decisions are documented in Section 11, Deviations, Exceptions, and Waivers.

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1. Introduction

This is a support task, beginning with many activities already in progress, providing assistance to JPL with functional design, implementation, test, documentation and training for Metric and Pointing Assembly (MPA) and Metric Tracking Assembly (MTA) upgrade.

1.1 Background

DSN is geographically distributed, complex, reliable, communication network. The DSCC Tracking Subsystem (DTK) is a component of the DSN Tracking System and contains the MPA and MTA subsystems. The MPA performs the tracking and antenna pointing functions for the 26-meter and 9-meter antennas at the various DSCCs. The MTA performs the spacecraft tracking and antenna pointing for the 34-meter DSS 27 antenna at the Goldstone DSCC.

1.2 Purpose

The purpose of CWO 10 is to finalize the MPA OP-C software delivery, provide on site testing and software delivery of the MTA software and provide MPA OP-D enhancements to the MPA software.

2. SOW & Deliverables

2.1 SOW

All work shall be in accordance with JPL D-4000 Standards. Development shall include demonstration tests to verify the incremental capabilities. The contractor shall provide the deliverables in section 2.2

The contractor shall assist JPL personnel in the conduct of tests to verify capability and in diagnosing and correcting problems encountered in the field. For MPA OP-D, contractor shall define new capabilities, delineate demo test schedule, and publish capabilities memo documenting approach adopted.

2.2 Deliverables

2.2.1 CWO Specific Deliverables

	<u>Deliverable Description</u>	<u>Completion Date</u>
1	MPA OP-C Final RDD	11-30-94
2	MPA OP-C Final SOM	11-30-94
3	MPA OP-C Final SSD	11-30-94
4	MTA Draft SOM	12/9/94
5	MTA STP-1,2	3/17/95
6	MTA Final SOM	3/17/95
7	MTA Code Delivery	3/17/95
8	MPA OP-D NDIU Prototype results memo	11/30/94
9	MPA OP-D S/W Capabilities memo	1/13/95
10	MPA OP-D Engr. Version Code Delivery for DTF-21 NDIU Testing	1/17/95
11	MPA OP-D Draft SOM	7/28/95
12	MPA OP-D Draft STP 1,2	7/31/95
13	MPA OP-D Code Delivery	8/1/95
14	MPA OP-D Training Materials	8/12/95
15	MPA OP-D Final SOM	9/15/95
16	MPA OP-D Final SSD	9/15/95
17	MPA OP-D Final RDD	9/15/95

2.2.2 Deliverables Required by Contract or Derived from the CWO

See contract No. 960100 for specific data requirements of the CDRLs identified below.

1. MA005 - CWO Implementation Plan - draft, final, and updates as required
2. MA006 - Monthly Progress Report
3. MA007 - CWO Weekly Status and Major Problems Report

3. CWO Development / Implementation Approach

3.1 CI Development

The software is developed on Modcomp 68K and 88K based platforms located at the ISDS facility. The Modcomps use Real/IX a Unix type operating system tailored for the real-time environment. All tools required for development reside on the Modcomps.

After coding, the software is tested using simulation tools (including the SIV) executing on the Mod-comps. The software is then tested at DTF-21 which contains real hardware that the MDA software interfaces with. Finally the software is tested at the DSCC using real and simulated tracks. Concurrent with this testing are updates to any test procedures to be used as part of acceptance.

Completion of the above testing means the software is ready for acceptance test. Prior to this testing the software is moved from the developer configuration management system (SCCS) to the ISDS configuration management system (CCC). The software is then transferred to SPMC and a 'green disk' created. This software is then acceptance tested at the DSCC.

3.2 Documentation

Documentation tasks consists of preparing new or modifying existing documentation using Word or Word Perfect with final formatting to DSN standards accomplished by the ISDS technical publications group. The final versions are delivered to SPMC in electronic format.

4. Management Approach

The management approach for this CWO is derived from and is consistent with the ISDS Program Management Plan. CWO specific items are limited to the WBS and the details of the CWO.

4.1 Subcontractors

4.1.1 Computer Sciences Corp (CSC)

Infotec has retained CSC as its subcontractor for the ISDS contract. The terms and conditions of this subcontract are contained in Infotec's subcontractor agreement SK9503.

The ISDS team which consists of Infotec and CSC operates as a virtual corporation with all direction and decisions residing with the Infotec PM. Technical direction of each CWO resides with the CWO manager regardless of company affiliation. CWO staffing is based on the best personnel able to meet the needs of the CWO without regard for company. JPL's interfaces with a single point of contact, the ISDS team.

4.1.2 Affiliates/Consultants

There are none.

4.2 CWO Change Management

Change management for this CWO follows the process defined in the ISDS program Management Plan and in the Contract.

4.3 Tracking the Work

Schedules are given to all personnel working on the CWO. The schedule contains the individual's tasks and expected completion/milestone dates. In addition, all CWO personnel are given a Work Authorization Document (WAD) which contains valid time charge numbers correlated to the CWO tasks.

Weekly status reports are submitted by the CWO personnel to their CWO manager. These reports are used to update the CWO schedule contained in Microsoft Project and track CWO progress. CWO costs

are collected and tracked in Microframe using CWO personnel timecard data and MIS data downloaded from corporate computers.

5. Risk Management Plan

Risks specific to this CWO are presented in the following two tables. The first, Table 5-1, enumerates the high level risks associated with this CWO and with most CWOs.. The second, Table 5-2, enumerates critical risks, impact, and the technical and managerial mitigation strategies for this CWO.

Table 5-1 - High Level Risks for the CWO

Type	Factor	CWO	Mitigation
known	Assumptions	Skill mix Technical Assumptions	Scope of CWO Scope of CWO
potential	Commitments	GFE availability and quality	Identify it all, plan for it
	Technical / Management	Estimates & assumptions Interpretation of requirements Availability of key personnel	Interface with JPL to identify ahead of time Interface with JPL to identify ahead of time Skills are generally available in the job market
	Knowledge loss at CWO end	Inability to respond to prob- lems or change requests	All work is documented and checked.
Unknown	--	Changing funding & priorities Changing requirements Key personnel attrition	All work is documented and checked. All work is documented and checked and necessary skills are generally available in the local job market

Table 5-2 CWO Requirements Risks, Impact, and Mitigation Strategies

Risk	Impact if Risk Realized	Mitigation
No critical risks identified		

6. Work Breakdown Structure (WBS)

The CWO uses the standard ISDS WBS, modified to reflect the SOW.

CWO 9
ISDS Work Order Authorization

Employee:	Stan Mak	Company:	IDI
Employee:	Sid Dains	Company:	CSC
Start Date:	14 Dec 94	End Date:	17 Sept 95
		Revision:	1

You are authorized to use these WBS numbers from start of business on the start date through close of business on the end date

ISDS

WBS Num- ber	Description of Work
313	MPA OP-C Implementation, unit test, developer integration & draft user doc't
323	MPA OP-D Implementation, unit test, developer integration & draft user doc't
324	MPA OP-D Initial software maintenance
383	MPA OP-C+D Final document packaging, editing, publication preparation
391	MPA OP-D Engr Build for DTF-21 NDIU Testing
392	MTA & MPA OP-D test: planning, scenarios, testing, anlaysis, reporting
74	On-site SRE Interface Testing
75	Supporting MTA & MPA operation
84	MPA OP-D training preparation: audience identification & assessment, syllabus generation, creating lessons & training materials
85	MPA OP-D training classes

7. CWO Organization and Staffing

7.1 CWO Staff Names, Qualifications, & Availability

Since this CWO is an extension of the effort under Telos CWO 14 , Sid Dains and Stan Mak (identified by JPL as key to effort) have been transferred to the ISDS team and are available full time for the task duration.

7.2 CWO Organization

CWO task manager is Chad Nikoietich, who reports to the ISDS program manager, Kent Thomson.

7.2.1 CWO in the JPL Organization

This CWO supports R. Crowe of Real Time Systems, a branch of Section 394, Network Engineering.

7.3 Staffing Profile

This is an LOE support task for two persons for the specified period. It has a constant two (2) FTE staffing profile.

7.4 Estimation Approach

Estimation for accomplishing this work is based on engineering judgment and experience acquired from previous DSN work.

8. CWO Schedule and Dependencies

8.1 Schedule

See attached schedule.

8.2 Dependencies

Dependencies are those items outside the control of the CWO manager. We identify them here so we can plan for and manage them. Critical dependencies, if any, are included in the Risk Management Plan. The dependencies on this CWO are:

Mission constraints: None

JPL facilities: DTF-21, Goldstone availability.

JPL support: DTF-21 and Goldstone.

User availability: None

Site personnel: DTF-21 and Goldstone personnel availability.

GFE/GFI: none.

9. GFE/GFI Items

No particular GFE items are dedicated to this CWO. For a list of all GFE items utilized by the ISDS team refer to the ISDS GFE List.

10. Close-out Plan

This section will be provided 30 days prior to CWO end.

11. Deviations, Waivers, & Exceptions

This CWO has no deviations to established standards and procedures.